

# POPULAR **Computing** WEEKLY

29 July 1982 Vol 1 No 15

**35p**

**Meltdown on Vic 20**

**BBC graph plot**

**ZX81 keyboard  
repeat**

**Spectrum  
fortune**

**Goto  
destinations**

**Win a ZX Spectrum  
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details inside**



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### Advertisement Manager

David Lake [01-939 2846]

### Advertisement Executive

Alastair Macintosh [01-930 3840]

### Managing Editor

Duncan Scot

### Publishing Directors

Jeremy Ireland

Nick Hampshire

### Popular Computing Weekly

Holthouse Court, 119 Whitcomb Street,

London WC2

Telephone: 01-639 8835

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### How to submit articles

Articles which are submitted for publication  
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All submissions should be typed and a double  
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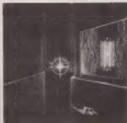
Programs should, whenever possible, be  
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At present we cannot guarantee to return  
every submitted article, so please keep a copy.

### Accuracy

Popular Computing Weekly cannot accept any  
responsibility for any errors in programs we  
publish, although we will always try our best to  
make sure programs work.

## This Week



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## Editorial

In common with most other microcom-  
puting magazines, we are inundated  
with programs. Every day readers  
send in programs in the hope of  
having them published in Open  
Forum.

However, most of these programs  
are based around a few basic games.  
Moonlander, Space Invader and Fruit  
Machine programs abound. Puckman  
is another favourite.

There is nothing wrong with these  
games. They have provided hours of  
fun and entertainment for micro-  
computer enthusiasts.

But, there is little point in re-  
inventing the wheel. While there is a  
certain amount of satisfaction to be  
gained from writing your own version  
of noughts and crosses or meteor run,  
there is far more satisfaction in writing  
a completely original program.

Once you have mastered the basics  
of programming, there is little point in  
continually imitating other people's  
efforts. You will learn more from think-  
ing up your own games than you will  
from copying established programs.

Writing software programs is rather  
like learning to fly. There comes a  
point where you must go solo.

## Next Week



A deadly assassin has  
disrupted your jungle Kingdom  
and must be eliminated in this new  
game for Spectrum — Hunter Killer



## Sinclair to launch dial-a-program

SINCLAIR is developing a Prestel adaptor for the ZX Spectrum. It should be available in the first half of next year and will cost "substantially less than £100" according to Nigel Searle, head of Sinclair's computer division.

The Prestel adaptor will make it possible to both upload and download software from the Spectrum to Prestel. Instead of loading programs from cassettes or discs, you will be able to dial a program directly into the Spectrum via a tv set.

There are a number of advantages in using Prestel, or

teletext, said Searle. Teletext software can be constantly updated and it obviates the need for large storage devices.

But, the key to the success of this scheme is the cost of the adaptor. Martechchoice Ltd, winner of the British Telecom ZX81 Prestel adaptor competition, will be charging in the region of £130-£150 for their adaptor when it goes on sale.

A Spectrum adaptor will be substantially cheaper, because the Spectrum already contains a colour modulator. But, even allowing for this, it is likely to cost at least £20 and possibly



Searle's Nigel Searle

as much as £50.

However, Searle is convinced that teletext software will play an increasingly important part in the home computer market. "The future of personal computing lies in communication," he said.

## Dragon goes for a two-pronged attack

HARD on the heels of the announcement of the new Dragon 32 micro comes news of a further machine from Mestey.

The company is to produce an advanced Dragon in early 1983.

It will have 64K Ram, enhanced graphic capabilities and will probably include a disc-operating system and be capable of running CP/M software.

Aimed more at the business user, the machine will sell for about £250.

Development of the minifloppy disc system for the Dragon 32 is well advanced and the system is planned to be available at the end of this year.

## Japs aim for a supercomputer

THE development of a "human" computer is the long-term aim of a new Japanese research program.

The 10-year project has been started by a team of workers in Japan. The hope is to make a 5th generation computer that will reason and speak much like a human.

The work, being carried out at the Institute for New Generation Computer Technology in Tokyo, is still in its initial stages.

The problem-solving and inference-making parts of the project will be key developments. It is hoped to produce a supercomputer that can make more than 100m logical inferences per second — an order of about 1000 times faster than present computers.

Reaction to the proposed development has been muted.

## Welcome to the machine

THE British Passport Office has been evaluating equipment capable of handling machine-readable passports.

But already civil rights organisations fear a further invasion of individual privacy if the system was to be linked to other computers, such as the Police National Computer.

A Home Office spokesman has insisted that no such link is planned.



A pet watchdog at the Cleveland Boys' hike.

## Setting Pets loose in wide-open spaces

PETS are venturing out into the moorlands.

The progress and safety of those taking part in the annual Cleveland Boys' Brigade hike, on June 26 and 27 has been monitored using a Commodore Pet.

The two-day event involves an enthusiastic traverse of the North Yorkshire moors. Each team must complete a course planned between 12 widely

spaced checkpoints.

The Pet is used to provide up-to-date information of the stages of the event and to warn all groups that are overdue at their check-points.

Apart from the vital safety that the micro system affords, it is also used to give a breakdown of each hiker's position, points, and overall time, within minutes of the last walker crossing the finishing line.

## Soft soap from Sinclair

SINCLAIR is to give away a cassette of introductory programs with every ZX Spectrum.

By the end of August, each Spectrum buyer should receive a free Horizons software starterpack. Those with Spectrums already will also get their packs, though it may be September before they arrive.

The Horizons cassette is produced for Sinclair by Prism.

On one side is a five-level keyboard trainer program. On the other side there are ten demonstration programs, putting the micro through its paces.

Sinclair is expected to release further software for the Spectrum shortly.

## Spectrum now visibly extended

KEMPSTON Electronics has launched a selection of add-ons for the ZX Spectrum.

The company has produced a two-slot motherboard and a 24-line input/output port.

The port is accessed by the In and Out commands on the Spectrum. Built around a single MOS chip, the port is mapped and can be configured in a variety of ways. The three 8-bit I/O ports can be assigned as either In or Out by the Spectrum.

When the port is used together with the motherboard the second slot can be used for a stackable connector or to add a printer or microdrive.

THE I/O port costs £16.50. The two-slot motherboard costs £16.95. Both are available from Kempston (Micro) Electronics, 60 Adamson Court, Hillgrounds Road, Kempston, Bedford.

## Gargle-blasting

SINCLAIR Research now has a staff of 42. Those not familiar with the *Hitch Hiker's Guide To The Galaxy* should note that this number is the answer to "life, the universe, and everything".

# READ-OUT

READ-OUT FOR  
SOFTWARE  
& BOOKS

## POPULAR COMPUTING WEEKLY/READ-OUT BOOK SERVICE

### For the BBC Micro:

If you own a BBC Micro, the *Practical Programs for the BBC Computer* by David Johnson-Davies, is the book for you! It contains over twenty practical programs ranging from maths and graphics to language manipulation and games. The programs have been tested and they work!

Now that Auntie Beeb is actually delivering its micros to customers, *BASIC Programming on the BBC Microcomputer* by Neil and Pat Cryer will provide an excellent introduction on how to program in BASIC specifically for the BBC Micro. Every program has been tested on a production model.

### For the ZX81:

*Bytting Deeper into Your ZX81* by Mark Harrison is the bestseller which tells you how to get to grips with your ZX81 and with 39 programs to match!

The *ZX81 Pocket Book* by Trevor Toms covers the use of the ZX81 in detail and leads the reader into a clear understanding of programming.

20 *Simple Electronic Projects for the ZX81* by Stephen Adams can really put your ZX81 to practical use in a number of electronic projects — thermometer, burglar alarm, voltmeter etc.

*34 Amazing Games for the ZX81* by Alistair Gourlay, shows you what you can do with only 1K of memory.

### For the Beginner:

An excellent introduction for beginners and an invaluable aid for enthusiasts is *The Personal Computer Book 2nd Edition* by Robin Bradbeer which tells you all you need to know about microcomputers.

"... sets out in a very entertaining and readable form the facts on owning a computer ..."

*Computing Today*

"Robin Bradbeer's book provides all the information in one place, in a sensible order and in a consistent, clear style." *Practical Computing*

### For the PET:

*Learning to Use the PET Computer* by Gerry Marshall is the first in a series of books that introduces popular micros (others to follow are ZX81, ZX Spectrum, VIC-20 and BBC Microcomputer). It eases the reader into a clear understanding of his computer.

*Programming the PET/IBM* by Risto West is quite simply the best book on the PET ever published. It contains everything you'll ever need to know about the PET and its workings.



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PCB-3

# Letters

write to Letters, Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2

## Whether it's nobler to have 10 megabytes etc.

WITH regard to Robert Lober's letter (PCW July 11), he says, "I am sure it is better to have a highly expandable system, with the most powerful Basic and the highest-res graphics for under £600, than a ZX Spectrum which can only play one note at a time compared with the BBC's four."

May I say that Mr Lober misses the point. The ZX Spectrum costs £125 compared with the BBC Model A's £299. It would be better to have a 10 megabyte computer that did the washing up than an unexpanded ZX81!

PS, Mr Lober also says that Sinclair claims the BBC micro has no Verity command. This is incorrect. If you look in the "comparisons table" you will see there is a tick in the Verity section of the BBC micro's column.

## I say, just a minor gripe or three...

I AM writing in response to your review (July 8) of the Dragon 32 micro. Of the computers which this machine is most likely to affect, most prominent is probably the Texas Instruments 99-4A, which is currently selling at Argos for £189 — quite a drop from the £240 which it sold for earlier in the year, and an even steeper drop from the £395 which I paid for my early NTSC 4 some two years ago.

What has really prompted my response is the statement in your Dragon review where you state that Print @ and Print Tab are fulfilling the same function. They most certainly do not. Somebody is missing something!

Print @ allows you to specify both a screen row and a screen column as the starting point for the printing of a piece of information. This not only enables you to format the screen output very effectively, but also permits the printing of information in any sequence — i.e. first bottom of screen, then top, then middle, say — and without disturbing the current contents of the screen by scrolling.

Print Tab on the other hand, is a function of the standard Print command, which (a) allows the specification of a screen column only, and (b) follows the sequential print-out, perhaps involving scrolling on some machines, on others following the printout from top of screen to bottom.

To say that the two commands are virtually identical is to say that input and Inkeys or Get are identical. True, they

perform similar functions, but would you say that only one was necessary?

Apart from this, I have only one minor gripe. It is confusing when you refer to yourselves as PCW, as Personal Computer World best you to that one four years ago. The use of initials not only saves time when writing, it is also far easier to communicate verbally. The trouble is that now we have to differentiate between the two PCWs. Any suggestions?

Finally, I must echo the comment of one of your readers with respect to Citizen Pain. Either expand it into a full feature, or drop it altogether, please.

John Drake  
49 Arbours Road  
Gillingham  
Dorset DT14 3JH

## Hey presto: you too can be an editor

RECENTLY I was looking through some of my old computer magazines and I stumbled across a letter in the Peek & Pokes section of PCW, issue number 5, from Simon Gray, who complained of not being able to edit. All he has to do is to clear the screen before he presses Edit and hey presto his line should appear at the bottom of the screen. I used to have the same problem when working in 1k on my ZX81.

Jon Thane  
83 Caversham Road  
Rye, East  
Sussex  
BN26 6RHS

## Having three bytes at the cherry

UNFORTUNATELY for program writers, when Sinclair de-bugged the ZX81 they changed the addresses of some of the routines in the Rom. In particular, Slow and Fast were both moved up by three bytes.

Consequently, readers who have machines with the new Rom should make the following changes to my Remloader program (June 17):

29 at 16517 should be changed to 23  
25 at 16687 should be changed to 25

D. L. F. W. Rowe  
31 Manor Park  
Oxley St. Ave  
Exeter EX2 1JH

## Just delighted to become debugged

As a Sinclair ZX81 user, I am very impressed by the aims of your magazine in bringing to the home computer user a cornucopia of informative articles and programs in a weekly publication. However, I have found the error rate in your published programs a little annoying,

especially in your cover story programs.

I have only taken the trouble to key in two of these to date, and both had a number of errors. This is particularly disturbing when the programs are supposed to be "computer printed". One can only assume that your writers do not attempt to run the program fully once written. The particular programs I refer to are Planet Ruler by Dave Middleton and Shark Attack by Dave McGuire. The bugs I refer to are as follows:

Planet Ruler  
Line 2339 LET C = INT RNDX10

This line, as printed, will always return the value 0 for C and, therefore, the cost of opening a mine will always be 17. The line should read LET C = INT (RNDX10).

Line 3168 LET P = P + 1

This will only increase the population by one each year, irrespective of the number of immigrants calculated and displayed. The line should read LET P = P + I

In addition, there should be a line 6215 Pause 75 as the present listing clears the screen before the player has a chance to read the lines printed at 6205 and 6210.

I would also comment that, for a program which hinges around the screen display of written information for the player, the speed display was most unimaginative. Judicious use of the Tab and Print at functions would have improved this immeasurably.

Your response to this may be that you expect your readers to amend the published programs to their own taste. However, speaking for myself, if I have spent two hours keying in a program I have no desire to spend another two hours tidying it up before I am able to run it satisfactorily.

There are two errors in the Shark Attack program which, luckily, I was able to spot before I wasted a lot of time keying it in. This was because I have just started to work my way through Tom Baker's excellent book on machine code. Had I not had this advantage, I imagine that I would have spent several frustrating hours trying to get the program to run, and failed.

In the machine code loader there should be a line 515 LET A=A+1, otherwise the loader continues to Polve the code to 16514. The machine code routine should end with a return instruction (return to Basic) or the code will crash. There is therefore an additional byte to those printed which should have the value 201.

Once running, the program was immensely enjoyable. I think it is a pity that many of your readers were probably frustrated in their efforts to load the program correctly by these errors.

James Oswald  
58 Gurney Road  
Scholes, Stroud  
Glos GL8 3JH

COVER STORY

# Meltdown

A new game for Vic20  
by Malcolm North

You are in control of a nuclear power station. The automatic control systems have broken down. As the senior officer on duty, it is your responsibility to prevent the uranium core from going critical and covering the surrounding countryside with radioactive waste.

There is an emergency back-up system, complete with manual controls, for governing the power station. Unfortunately, the back-up system only has a limited power supply. When the power runs out, there is nothing to stop the core from going critical.

Your primary duty is to keep the core from melting down for as long as possible, giving the local population a chance to escape. If you manage to keep the station running for two and a half hours, a specialist repair team will arrive and mend the broken control systems.

The key to controlling the uranium core

lies in the carbon damper rods. These rods absorb the neutrons emitted by the uranium. Thus, by raising and lowering the rods, you can control the speed of the nuclear reactions inside the core.

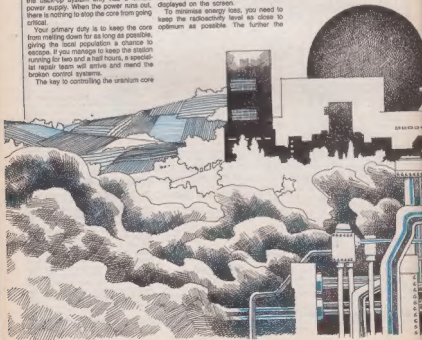
This program runs on an unexpanded Vic20. You can control the damper rods by means of the function keys.

The damper rods, the level of radioactivity, the power supply for the back-up controls, and the elapsed time are all displayed on the screen.

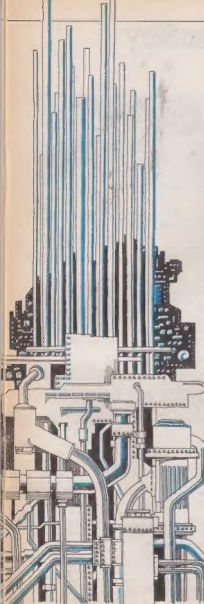
To minimise energy loss, you need to keep the radioactivity level as close to optimum as possible. The further the

radioactivity level gets from the optimum point, the more power is used up. If the level of radioactivity gets too high, nothing can stop the core from melting down.

Just to make things more difficult, the longer the game goes on the faster the changes in the level of radioactivity in the core. It will take a skilful player to survive until the repair team arrives.







1. Turbine engine assembly and components

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# Reader Survey

We would like to know more about you. To that end the eccentric academic Boris Allen has devised a novel way of allowing you to express your views. It is all done by numbers.

All you have to do is fill in the boxes below, write a slogan, send the page, or a copy, to PCW and you stand a chance of winning a £10 gift voucher.

Boris Allen writes: Some magazines are more alike than others. For example, some magazines usually have better love stories than others and magazines with recipes tend to have knitting patterns — but not always.

Use your judgment to make such comparisons and fill in these boxes on a scale from 1 to 7. If two items are more or less identical give a score of 1; eg Your ideal computer magazine will always have bug-free programs put a 1 in that box.

If two items are totally different, or never go together, give a score of 7; eg if Your ideal computer magazine will never have Old news give a score of 7. If you do not know, give a score of 4. If you do not read one of the magazines leave the appropriate box blank.

Your Computer

Computer & Video games

Useful reviews

Old news

Interesting letters

Personal Computer World

Personal Computing Today

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Computing Today

Sinclair User

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21 to 25 ☐

26 to 35 ☐

36 to 50 ☐

51 and over ☐

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Old news  
Interesting letters  
Personal Computer World  
Personal Computing Today  
Bug-free programs  
Badly set out  
Computing Today  
Sinclair User  
Good articles

What three things would you most like to see in Your ideal computer magazine?

1.  2.  3.

What three things would you not like to see in Your ideal computer magazine?

1.  2.  3.

Would you buy a binder to keep your copies of Popular Computing Weekly?

Yes ☐ No ☐

Have you had difficulty finding copies of PCW. If so please say where \_\_\_\_\_

And now for the fun bit, which could win you some money. Pretend that you have been commissioned by a leading advertising agency to write a promotional slogan for Popular Computing Weekly:

My advertising line (in less than 15 words including the name Popular Computing Weekly) is \_\_\_\_\_

Now either cut out this page, or make a copy, and send it to Popular Computing Weekly, Hobhouse Court, 19 Whitcomb Street, London WC2E 7HF.

POPULAR COMPUTING WEEKLY

# Street Life



The student Tony Latham with neighbour and partner John Knight

## Their problems shared are soon solved

*David Kelly talks to Tony Latham of the Computer Users' Club.*

Someone must have once observed that the quickest way to learn about a person is to look at the place where they live.

Tony Latham's abode gives many clues as to his main enthusiasm. Tucked away in every corner of his living room are bits and pieces of computers. And there is evidence in his handwriting everywhere: the suite of furniture is home-made and the lowered glass ceiling hides a complex disco-lighting arrangement.

He cheerfully recalls that he has been involved with electronics all his working life. As an angler he repairs electronics appliances. When Tony first became interested in microcomputing everyone was still having to design their own — the Latham computer cluttered up the bathroom for some time.

In July last year, Tony helped to set up the Computer Users' Group. Despite the fact that they keep a low profile and do not advertise, knowledge of the group has spread by word of mouth. Now, 12 months after formation, the club has over 500 members.

The group offers a monthly newsletter and a friendly telephone or return-of-post problem-solving service.

Originally started by a small number of electronics students, who went their separate ways but stayed members, the Computer Users' Group has quickly become established as more than a local or regional group. Now it has members as far afield as the Outer Hebrides, Europe and even Africa.

Although members have all sorts of

machines, Tony thought it important to standardise the output from the group. For this reason, shortly after the club began, the BBC micro was selected as the common medium of the group.

Since the size of the Computer Users' Group has grown, it now takes three pairs of hands to keep it running. Tony, his wife Iris, and a neighbour, John Knight,

Most subscribers are professional or business people of one sort or another — chemists, headmasters, shop keepers, doctors. As a result, most of the information the club provides and disseminates in its monthly 15 page newsletter has tended to be applications-based.

Programs published by the club are thought out, not just to be of direct use, but also, it is hoped, to demonstrate different programming techniques.

When the idea of an educational Hangman program was thought up, one of the group, who is a conductor, provides a musical accompaniment for the game in three-part harmony. Another subscriber is using a micro to assist in the design of a 200.

When Tony and his cohorts first decided that they wanted to help people in difficulties with their micros, they thought of opening a shop.

When that proved to be too costly to set up, they organised the Computer Users' Group. With membership quickly increasing they are well pleased, and believe they are providing a much-needed service.

Membership costs £5 or £12 for either a six-month or twelve-month subscription.

For further details contact Tony Latham, Computer Users' Club, 72 Sidmouth Road, Welling, Kent (Tel. 01-304 3910).

## What's happening

Streety Computer Club has been formed and meets every second Sunday at the Streety Community Centre, Foley Road East, Streety. For more details contact Paul Fitzmaurice, 86 Bankside Crescent, Streety, Sutton Coldfield.

## Putting on a joint show in Sussex

Six micro clubs in Sussex joined together to hold a micro computer show at Field School on Saturday June 12.

John Heron, the organiser, was very pleased with the way the show went. More than 500 people turned up to see the exhibits.

Among the attractions were stands from the six local groups with almost every type of micro being demonstrated.

The Field School computer facility was represented by Dave Frith who kept seven Pits in continuous operation.

Because of the success of this first field show, plans are already under way for another show next year.

The six groups involved were Crawley ZX81 Users' Group, Contact John Heron, 23 Pelwath Court, Bewbush, Croyley.

Mid-Sussex Micro Computer Club, Contact Bernard Langton, Tash, Broadwater Lane, Croydon, Merton, Sussex.

Brighton Area ZX80/81 Users' Group, Contact John Ireland-Hill, 145 Godwin Road, Hove.

Crawley Computer Club, Contact Chris Seager, 43 Jewel Walk, Bewbush, Croyley.

Bognor Computer Group, Contact Neil Voss, Grays Cottage, 38 Aldwick Avenue, Bognor.

Hassocks ZX Micro Computer Users' Group, Contact Paul King, 25 Fir Tree Way, Hassocks.

Below there was plenty of interest at the Sussex micro show at Field.



# Reviews software

## Fortune

AVC Software, PO Box 415, Birmingham  
Spectrum, 16K-48K, cassette  
Price £2.00.

It is an obvious move, when a new machine appears, for software houses to take the easy way out and simply modify their existing library of programs.

This program is one such example — it is a Spectrum version of AVC's 16K ZX81 program *Madame Zax*!

AVC — one is always a little uncertain about buying programs from companies that hide behind a PO Box number — apparently specialise in learning programs. This is about the closest thing to a general interest title in their list.

The program begins by ascertaining the enquirer's vital statistics: name, sex, date of birth etc. and uses these to make predictions of the future.

After a few, not entirely successful attempts at humour, the fortune-teller displays a fairly accurate star-map of the relevant Zodiac sign, with personal details superimposed.

There follows a description of the victim's personality, with a set of positive characteristics listed randomly together with suitable messages.

The program closes with a hopeful request for money. Presumably one is to cross the computer's palm with silver!

*Fortune* starts and restarts automatically and is fully mug-trapped. Consequently, it should be safe enough with hordes of summer fan-geeks seeking advance warning of the future.

### Summary

A reasonable program for those who have actually got their Spectrum. The new machine is so much more advanced than the ZX81, however, that converting games for the ZX81 is not necessarily the best way of providing Spectrum software. **KJ**

## Program Enhancement

R & R Software, 34 Bourton Road, Tuttle, Gloucester.  
ZX81, 16K, cassette.  
Price £5.55.

The Program Enhancement Package, or P-E-P, is a selection of subroutines to give greater flexibility to the screen display of the ZX81.

The P-E-P tape includes the package itself and a demonstration program to illustrate the scope of the facilities offered.

There are six short machine-code programs included in the cassette. Scroll, Fill-screen, Clear-screen, Inverse screen,

Fill-background and Fill-foreground.

In order to use these routines within a program under development by a user, the P-E-P must be loaded before the programming session is begun.

The P-E-P begins at line 9980 so there is plenty of room to write programs before the routines. The first line of any program written after the P-E-P has been entered should be Gosub 9980 in order to set up the P-E-P's mnemonics for the entry points to the subroutines and the control variables.

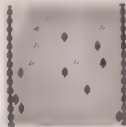
Scroll allows scrolling both up and down the screen. Fill-screen quickly fills the screen with any selected character. Clear-screen is a very fast clear screen facility.

Inverse-screen changes every character on the screen to its graphic inverse, and back again if used twice. A development of this will give a flash invert. Fill-background and Fill-foreground do just that within the same limits as those defined by the Fill-screen command.

The P-E-P cassette is supplied with an extensive booklet describing the use of the routines.

### Summary

A useful selection of subroutines. Essential to anyone interested in graphics or animation on the ZX81. **OK**



## Robot Zap

Available from Acids Home Computers Ltd, 154 Victoria Street, London W3 and other Vic20 dealers.  
Vic20, cassette, 3.5K.  
Price £2.95.

Robot Zap is one of six Vic20 programs written and sold by Simon Taylor of Taysoft. His name appears in some of the official Commodore Vic20 software lists.

The game uses joysticks or keyboard control. A rectangular box is created in red on the screen and ten black crosses, or

pylons, are placed randomly inside the rectangle. Five robots are then placed on the screen and, finally, you appear.

The robots are programmed to break all three of Asimov's famous laws of robotics. In other words the robots are trying to zap you. The robots are, however, somewhat simple and with very little skill you can lead them to crash into one of the pylons. If, by chance, or lack of attention, you are ever in trouble, you can press the joystick control button to jump elsewhere on the screen.

After a couple of goes, all the intricacies of this game had been mastered. This is one of those games for a 3.5K Vic20 which would be fine and interesting to study if one could copy the listing out of a magazine. It is not worth spending £3.95 on it.

Another of Simon Taylor's programs is called Alien Blaster. This also sells for £3.95. The saving grace of this package is that both Robot Zap and Alien Blaster can be bought on the same cassette for £4.95.

Alien Blaster is a far more interesting game which makes impressive use of the Vic's graphics and sound facilities. In the centre of the screen are your laser gun sights. Alien spacecraft appear on the screen one by one.

With a bit of effort on the joystick you can put the alien ships into your sights and fire at them. The game is a race against your dwindling energy reserves. You start off with 200 units of energy but every ship uses up 10 units. The alien craft hit back and every hit takes 50 units off you.

You can replenish your resources by destroying the alien ships. For a program written in Basic on a 3.5K Vic it is quite impressive and certainly better value for money than many of the other Vic programs or cartridges on the market. You can choose for yourself whether to buy Alien Blaster by itself for £3.95 or Robot Zap and Alien Blaster together for £4.95.

## Blitz

Commodore, 675 Ajax Avenue, Slough Trading Estate, Slough, Berkshire.  
Vic20 (no Ram expansion required).  
Price £4.99.

As the pilot of a bomber plane, your objective in this game is to flatten the city below so that you can land without crashing. The plane descends with no pass over the city, so if you fail to destroy the city you will crash into the side of building.

This simple and addictive program is one of the better games in the Commodore stable. It is difficult, but not impossible, to succeed in landing the plane. The problem is that you can only release one bomb at a time, and you cannot drop a second bomb until the first one has exploded.

# Reviews

## hardware

### Your Own Computer

By Michael Wade and Michael Pardee.  
Sams, 222pp, pb.  
Price £3.50

Little known in this country, Howard Sams is one of America's largest and most prolific computing publishers.

On the whole their publications tend to look rather unappealing — and this book is no exception. The impression from a casual view is that the design and presentation are anything but eye-catching.

The book is a fairly important one, however. It provides a reasonably successful beginners guide to microcomputing, combined with a brief buyer's guide.

The main drawback of *Your Own Computer* is that the view it takes is primarily an American one. There are books published in this country, such as *The Personal Computer Book* by Robin Bradbeer, which deal with the topic in a more informative and relevant way for a UK reader.

However, it does offer a very interesting picture of home computing in the US. The numbers look a lot like computers commonly found in American homes. Although the list includes well known machines such as ZX80s, Amans, TRS80s and Apples, it also includes less familiar ones such as Commodore. Costing as much as £10,000, these higher priced models are apparently not unusual additions to American domestic life.

#### Summary

Although it may not be as useful to micro owners in the UK as it has been to those in America, the book is still worth a look. **KJ**

### Keyboard Repeat

Heven Hangrace, 4 Asby Road, Asby, Worthington, Cumbria.  
Price £3.50 (kit) and £4.95 (board)

A device which makes the keys of a ZX81 repeat after a certain time can be very useful.

Just think over the number of times that you have had to slowly tap the cursor keys to get back to a mistake in order to amend it.

Another use is when making up Ram statements for use with machine code where up to 256 characters have to be entered to store the code at the beginning of a program.

This little printed-circuit board, approximately one inch square, will provide this facility if you are willing to pick up a soldering iron. The board has to be soldered to nine points on the ZX81's printed-circuit board. Five of these links go to the data lines from the Zx keyboard and two



Keyboard Repeat circuit board. Making black on white become white on black, the Inverse Video module.

go to the +5 and 0 volts. The other two are attached to two control signals beneath the Z80A microprocessor.

Entering these connections is fairly straightforward if you have used a soldering iron before. If you haven't then there is a problem, since the instructions will give you no help at all.

Again, the building of a kit will cause no problems to those used to a soldering iron.

On the reverse mode there were no sockets even though the instructions included with the kit say they are recommended. The capacitors were also soldered vertically instead of being in position on the board, as shown in the board's support within the unit. This made it impossible to close the case unless the printed-circuit board was turned round so that the capacitors were against the ZX81 circuit board.

Once fitted, the board worked well and every key repeats even when used with Shift.

#### Summary

The board works very well when fitted beneath the keyboard on the ZX81 and will even work with other keyboards fitted. But kits could, however, be assembled so that they can be fitted more easily. The instructions also need some revision to be more explanatory than at present. **SA**

### Inverse Video Module

Heven Hangrace, 4 Asby Road, Asby, Worthington, Cumbria.  
Price £4.95

The unit, about the size of a 10p piece, is supplied fully assembled and ready to solder on to the video modulator of a ZX80 or ZX81.

The simple connections to the printed-circuit board are (a) +5 volts, (b) 0 volts, (c) video in from the printed-circuit board, and (d) video out to the metal-canned video modulator.

Only one attention has to be made to the ZX81 circuitry, which is to remove the video input wire coming out of the modulator from the printed-circuit board. This is then connected to the inverse video modulator instead.

The printed-circuit board is small enough to fit underneath the video modulator inside the case.

The instructions are simple enough to follow, but no hints on soldering are given. A change-over switch can be fitted if required to switch between inverse video and normal. This is not included in the kit, but a suitable switch can be obtained in any electrical store.

The one problem encountered with the unit was its instability. The 4700 pF capacitor required charging to a 0.1  $\mu$ F. After this, the video could be adjusted by means of the variable resistor into the inverse video range. All this should be done of course after the power has been switched on again after soldering.

#### Summary

This is a useful unit, allowing the use of a ZX81 on its previously considered undesirable because of their high sensitivity. However, it is debatable that inverse video in this case while on black is, as claimed by the manufacturer, clearer to see than the more usual black on white. The instructions could be better and clearer. Problems, such as that found with the capacitor, could be avoided by testing the units more thoroughly. The price is quite cheap and well within the ZX users price range. **SA**

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# Spectrum

### Watching the characters as they grow . . .

*Martin Houston explains how to create user defined characters*

This is a utility program called Chr\$Maker for the ZX Spectrum.

Page 94 of the Spectrum manual gives a

simple three line program for creating user defined characters:

```

10 FOR N=0 TO 7
20 INPUT ROW: POKE USH, P + N ROW
30 NEXT N

```

In this case "P" is the graphic character that is re-defined.

But this approach has several disadvantages. The value of Flow has either to be worked out or entered in Bin format. In addition, there is no feedback to the user as the character is built up.

With my program a character can be built up and edited with a large screen.

display showing how it looks. Binary strings input by the user are also displayed as eight decimal numbers suitable for defining the same character from within the user's own program, using the above mechanism.

The program is a fast and enjoyable way of defining and editing the Spectrum character set.

Incidentally, I wrote this program on the day after my Spectrum arrived. This shows how fast it is to get used to the Spectrum, particularly for anyone who has used a ZX81.

```

10 REM User defined character
110 PRINT "PROGRAM"
120 REM User defined character
130 CLOSE #1
140 DIM C$(10,10) REM Matrix array
150 PRINT AT 0,0, " "
160 PRINT "Input the 1-3 matrix"
170 OF the character a-z, 0-9, 1-10
180 time. Using 0-1-10-10
190 Make binary string.
200 REM prompt to input
210 BRIGHT 1 BPRINT AT 10,10 " "
220 BRIGHT 10 PRINT AT 11,10 " "
230 BRIGHT 10 PRINT AT 12,10 " "
240 BRIGHT 0
250 REM " "
260 BRIGHT AT 13,10 " "
270 PRINT AT 13,10 "12345678"
280 FOR Y=9 TO 10 PRINT AT Y,10 " "
290 Y=9, PAPER 7, " "
300 PRINT AT 10,0, " "
310 PRINT AT 10,0, " "
320 PRINT AT 10,0, " "
330 REM array reading loop
340 DIM I=10 REM array
350 PRINT AT 21,0, " "
360 REM " "
370 LET I=INKEY$ IF I#"" THEN
380 GO TO 101
390 IF I=CODE("1") OR I=CODE("2")
400 THEN BRIGHT 1 GO TO 101
410 LET I=I+1
420 IF I=10 THEN GO TO 100
430 PRINT AT 21,0, " "
440 PRINT AT 21,0, " "
450 PRINT AT 21,0, " "
460 INPUT "Input row C$(10,10)"
470 FOR I=1 TO 10 IF NOT I=10
480 THEN GOTO 101
490 REM " "
500 PRINT AT 21,0, " "
510 PRINT AT 21,0, " "
520 PRINT AT 21,0, " "
530 PRINT AT 21,0, " "
540 PRINT AT 21,0, " "
550 PRINT AT 21,0, " "
560 PRINT AT 21,0, " "
570 PRINT AT 21,0, " "
580 PRINT AT 21,0, " "
590 PRINT AT 21,0, " "
600 PRINT AT 21,0, " "
610 PRINT AT 21,0, " "
620 PRINT AT 21,0, " "
630 PRINT AT 21,0, " "
640 PRINT AT 21,0, " "
650 PRINT AT 21,0, " "
660 PRINT AT 21,0, " "
670 PRINT AT 21,0, " "
680 PRINT AT 21,0, " "
690 PRINT AT 21,0, " "
700 PRINT AT 21,0, " "
710 PRINT AT 21,0, " "
720 PRINT AT 21,0, " "
730 PRINT AT 21,0, " "
740 PRINT AT 21,0, " "
750 PRINT AT 21,0, " "
760 PRINT AT 21,0, " "
770 PRINT AT 21,0, " "
780 PRINT AT 21,0, " "
790 PRINT AT 21,0, " "
800 PRINT AT 21,0, " "
810 PRINT AT 21,0, " "
820 PRINT AT 21,0, " "
830 PRINT AT 21,0, " "
840 PRINT AT 21,0, " "
850 PRINT AT 21,0, " "
860 PRINT AT 21,0, " "
870 PRINT AT 21,0, " "
880 PRINT AT 21,0, " "
890 PRINT AT 21,0, " "
900 PRINT AT 21,0, " "
910 PRINT AT 21,0, " "
920 PRINT AT 21,0, " "
930 PRINT AT 21,0, " "
940 PRINT AT 21,0, " "
950 PRINT AT 21,0, " "
960 PRINT AT 21,0, " "
970 PRINT AT 21,0, " "
980 PRINT AT 21,0, " "
990 PRINT AT 21,0, " "
1000 PRINT AT 21,0, " "

```

[illegible]

### Reader's contribution

## From circles into cones

This program enables you to draw two cones on the screen. You are free to select the colour, size and tilt of the cones.

The cones are created by drawing circles of steadily diminishing size. The maximum circle size is 50.

Andrew Astrachal

[illegible]

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$$\frac{\partial}{\partial t} \left( \frac{1}{2} \rho v^2 \right) = - \nabla \cdot (\rho v \mathbf{v}) + \rho \mathbf{v} \cdot \nabla \mathbf{v}$$

# Open Forum

Open Forum is for you to publish your programs and ideas.  
It is important that your programs are bug free before you send them in. We cannot test all of them.  
Contributions should be sent to: Popular Computing Weekly, Hobhouse Court,  
38 Whiccomb Street, London WC2H 7HF.

## How to contribute

Each week the editor goes through all the programs that you send to Open Forum in order to find the Program of the Week.

The author of that program will qualify for DOUBLE the usual fee we pay for published programs.  
(The usual fee is £10.)

### Presentation hints

Programs which are most likely to be considered for the Program of the Week will be computer printed and accompanied by a cassette.

The program will be well documented, the documentation being typed with a double spacing between each line.

The documentation should start with a general description of the program and then give some detail of how the program has been constructed and of its special features.

Listings taken from a ZX Printer should be cut into convenient lengths and carefully stuck down on to white paper, avoiding any creasing.

Please enclose a stamped, self-addressed envelope.

## Code Cracker

on ZX81

Code Cracker is the standard Mastermind game in which the computer generates a code using the numbers 1 to 6. The computer gives clues in the form of the number of blacks or whites you get. Blacks are where you got both the number and position correct, whites are where you got only the number correct.

You have ten guesses at the code after which the code will be revealed. For each attempt you are asked for your guess in the form "1234" or you may enter "R" to reveal the code and end the game.

### Program notes

Lines 10 to 50 set up the main variables.

Lines 60 to 80 set up the random code which you must guess.

Lines 120 to 180 ask for and score your entry.

Lines 170 to 250 count the number of blacks scored.

Lines 260 to 340 count the number of whites you scored.

Lines 350 to 429 decide if you scored four blacks or you ran out of guesses and give the option of another game.

```

10 LET C$=""
20 LET G$="1-6"
30 LET CODE=""
40 LET GOES=""
50 LET BLACK=""
60 FOR N=0 TO 5
70 LET C$=C$+STR$ (INT (RND*6)+1)
80 NEXT N
90 CLS
100 PRINT TAB 8;R;"CODE GOES BLACK WHITE"
110 AT U+0.0;"CODE GOES BLACK WHITE"
120 FOR N=0 TO 10
130 PRINT R;"ENTER CODE 1-6 TO REVEAL"
140 INPUT G$
150 IF G$="R" THEN GOTO 370
160 IF LEN G$<6 THEN GOTO 130
170 PRINT AT 20,R;"
3. GUESS TAB 7;STR$ N;
170 LET B$=""
180 LET W$=""
190 LET C$=C$
200 FOR X=0 TO 5
210 IF G$(X) <> C$(X) THEN GOTO 2
220 LET B$=B$+" "
230 LET C$=C$+" "
240 LET W$=W$+" "
250 NEXT X
260 FOR X=0 TO 5
270 FOR Y=0 TO 5
280 IF C$(X) = G$(Y) THEN GOTO 3
290 LET G$=G$+STR$ Y
300 NEXT Y
310 PRINT TAB 14;B;TAB 21;W
320 IF B$=" " THEN GOTO 350
330 NEXT X
340 PRINT AT N+R,0;"CODE "C$
350 GOTO 400
360 PRINT AT N+R,0;"WELL DONE"
370 PRINT "CODE REVEALED"
380 INPUT G$
390 IF G$="R" THEN RUN

```

Code Cracker  
by Ian Hunter

CODE	GOES	BLACK	WHITE
1-234	2	0	0
1-344	3	1	1
1-566	3	0	2
1-351	4	0	2
1-345	5	1	1
1-344	5	2	1
1-566	6	3	0
4-566	6	4	0

WELL DONE



## Open Forum

## Accounts

on VVo-20

This program is designed to run on the basic Vic20. The program allows for account data to be read from a cassette tape or for a new set of data to be started.

Once the account data has been read from cassette or the new balance is typed in the user is given the option to display the account on the screen, input new credit or debits, or to stop the program by dumping the account data back on to tape. Full use is made of Vlt colour and once the program is completed the screen is automatically returned to normal.

The program has prompts to help the user operate the program. The account data held includes either the cheque number involved or a simple explanation of the transaction, the sum involved and the current balance.

If account data has previously been dumped to tape this data can be reread into the program. When the program is stopped the closing routine asks for a filename to be used on the tape — eg 4TH JUNE or JUNE01

For added clarity all credit sums are displayed in green and debit sums in red with reverse on. On a black and white TV it is still possible to differentiate which is which by the light or darker shading.

If you are using the program for the first time you set your present account balance, then type in the credit or debit transactions, you then can display the information and/or dump the information to tape.

Due to the basic Vic20 limitation on user available Ram the program is restricted to three pages of account data — 45 entries. This restriction can be overcome if you dump the current data on to cassette, reload the program, type in the current balance and then continue. The account is capable of handling any sums up to typed in.

When displaying the account if there is no data on the page the user requests the instruction is ignored. A lower numbered page must be typed if there is no data held in the account you cannot display it. You must first type in a credit or a debit

Unit 5: Set up account data entry. D: Account details, N: Split, Y: Asset and C/D: Records whether sums are credits or debits.

Lines 15 to 65: User is given the option to read data from cassette or read stored balance.

Lines 560 to 580 Program is now opening, and the user is asked what he wants to do (see 560 to 580 Lines 2000 to 2010). This is the routine for accepting credit/debit cards into the account program. There are provided to ensure the cheque number or event equals 8 characters and that only LN for credit or DR for debit is used.

Lives: 2709 to 2950 Calculation of the credit or debit

### Accounts

by Keith Hall

[illegible]

to next page

## Open Forum

from previous page

and the placing of the data into the correct position in the array. Finally the user is asked if there are any more inputs.

Line 4002 is used for displaying the account balance in the screen and setting the credit card in use in concert with number 01.

every 1990 to 2010. Substrate for answering that at least one displayed with the decimal points in the one under the other.

and saving the account data on to tape. The user is asked to use the Floppy to be used.

Line 0028 Statement used to correct Philippe's email details

I was injured in 1995. Cell statement used as a tool to assist in nerve system.

The following items must be posted in reverse order:

Line 0 hardware entry gives: 1 page - 15 entries. Array  
size is 64 number of pages  $415 \times 15 = 6225$  - approx 6200  
pages!

Line 45 75 should be increased to equal entry 45  
Line 204B 80 should be increased to number of buses

2018年12月26日 星期三

Line 4000 3 - changed to the number of pages required  
After 4000 insert lines to the number of pages  
required (1978 41 - should be increased by 15 each  
time the page has 40 - 45)

## Keyboard Bleeper

can be used to estimate the

This short machine code subroutine will make a short beep every time a key is pressed. This is useful when debugging and the subroutine also debounces the keyboard. The first listing is an assembly language listing of the program while the second is a Basic listing which can be loaded in directly.

First I will give an explanation of the assembly language listing. Lines 300 to 700 change the keyboard driver pointer so that it now points to the bleepor subroutine. This means that every time the computer wants to know if a key has been pressed it will jump into the bleepor subroutine.

Lines 800 to 2100 search through eight bytes and checks to see if any of them contain a value other than zero. If it is found that one of them does contain a value other than zero then it signifies that a key has been pressed and control is passed on to line 2200.

The last section of the program makes the actual beep sound. The reason it is so short is because it uses a call to Rom in line 2300. This call is usually only made when writing data to the cassette but since the sound box uses the same channels as the cassettes the Rom call can also be used to produce sounds.

The only thing that needs to be said about the Basic using is that the memory size does not have to be set since the program does it by itself. The data value in line 50 can be changed to alter the length of the sleep.

```

4410 POKEX368="25" PRINT#3
4420 PRINT#2:DETAILS + CR/BS ML
4425 PRINT#1-----
4430 R2=R1+14 C1=C4 22 C1= RCTYEN#4
4435 FOR C=P1TOR2:WHILE 1) GOSUB1000:PIE=PIE+WHC 2
      :SUTR0000
4431 C1=" "
4435 IF C1=C4="BS THENLIS="BS"
4435 PRINT#3:(TAB 2) C1:PIE C2: TAB 1
4450 NEXTC
4455 PRINT#1:*****"1" = KEY
4460 GOSUB1950 GOTO4000
4465 R1=RIGHT$( "45TRIGHT(X),4)
4470 BSWLEFT4(MID$(STR$(INTEN INTEN) *10, -4),1)
4475 "00",2),2)
4480 IF C1=PIE+CR+BS RETURN
4485 "*****CLOSING PROGRAM INPLTYPE
FILENAME" AT OPEN 1,1,BS
4490 FOR R=1:FOR PRINT#1:BE(R) PRINT#1:R-1) PRINT#1
      :NR,2) PRINT#1:CURCY NEXT R
4495 PRINT#1:"END" CLOSE
4500 PRINT#3:ENDEND TAKE GOSUB1950 POKEX368="1"
4505 PRINT#3"END
4510 PRINT#3:CLOSE#3:CHRS#1 GOTO2300
4515 GOTO 1PRA# 1
4520 RETURN

```

### Keyboard Blesper

by Roy Gardner

## Open Forum

## Torpedo

no. 5281

Torpedo is a fast-moving graphic game which occupies less than 4K of the expanded Z801. The idea of the game is to torpedo as many of the 15 ships as possible as they move across the top of the screen at different speeds.

You control the torpedo base at the bottom of the screen on the seabed and can move it to the left and right with the 2 and 4 keys. To fire a torpedo press 9. Make sure you don't waste your torpedoes as you only have one for each ship.

One feature of the program is the full 24 line display. This is achieved by poking 16418 with 0. This memory location, 16418, is one of the computer's system variables and has the job of remembering how many lines are in the lower part of the screen.

Many memory saving techniques have been employed, the most obvious of which is the use of `PI#` and `PI!` instead of `0` and `1`. It is also cheaper to memory-alias to say `LET S VAL 22` rather than `LET S: 22`, a useful point to remember if you're running close to the limits of your computer's memory.

It is also worth noting that there is no limit to the number of print statements you can have in one line. This saves memory and also lets the program run faster.

The main repetitive loop of the program is from line 140 to 150. When it is entered the variable *C* is set to 0 and then the main loop is made to include lines 100 to 140 which release and move the torpedoes.

### Maths Quiz

of Vic 20

This is a simple maths program for the unexpanded Vic20. First of all the program will print out a question either addition, subtraction, multiplication, or division.

The numbers chosen for the question will be in the range of 0 to 50 but this can easily be changed by changing the value in the find statements from 50 to whatever. If the answer that you input is equal to the answer then the computer makes a sound and gives the big tick.

If you answer wrongly then the computer makes a lower sound and prints a big cross. This program takes up about 1 K.

## Reflections

DE 2581

This program allows you to create your own patterns. It is deliberately short so that as much of the memory of the TK machine

Go next page

Tempesta

by Ian Bonyon

```

5 POKE 15418,PI-PI
10 LET S=VAL "22"
20 LET H=VAL "13"
30 LET M=VAL "1"
50 LET A=PI-PI
55 LET T=PI-PI
60 LET SC=VAL "2"
70 LET G=VAL "31"
80 FOR N=0 TO VAL "23":N="":AT
90 PRINT AT VAL "23",N:"":AT
I,N,""
91 NEXT N
92 FOR F=1 TO VAL "15"
93 PRINT AT A,A:"SHIP NO. ",F,
AT A,22,"SCORE=";SC
95 LET S=VAL "(AND+3+1)/G"
96 LET D=0
97 LET C=1
98 LET E=VAL "22"
99 GOTO VAL "140"
100 IF Y=20 THEN PRINT AT Y,G,
X,"
103 PRINT AT Y,X:"0"
104 IF Y=1 THEN GOTO VAL "203"
105 LET Y=Y-G
106 NEXT Y
140 FOR N=0 TO VAL "25" STEP 2
142 IF INKEY$="2" AND S=PI-PI T
HEN LET S=S-G
145 IF INKEY$="4" AND S=VAL "2"
THEN LET S=S+G
150 PRINT AT VAL "5",N,"
AT I,H,"":AT 22,5)
155 IF C=0 THEN GOTO VAL "100"
160 IF INKEY$="9" THEN LET C=0
165 LET X=S+VAL "3"
170 IF C=0 THEN GOTO VAL "100"
190 NEXT H
195 GOTO VAL "200"
200 IF X=INT H+G AND X=INT H
VAL "1" THEN GOTO VAL "250"
210 GOTO VAL "200"
250 FOR N=1 TO VAL "15"
265 PRINT AT H,H,"":AT
H,H," + HIT + ";
265 NEXT H
266 PRINT AT H,H,""
270 LET SC=SC+1
280 PRINT AT I,H,"-----":AT VAL
L,VAL "26","-----":AT I,K,K:AT I
L,"25","-----":AT VAL "5",VA
L "25"
290 NEXT F
300 PRINT AT 10,0,"YOU SCORED "
SC,AT 13,1,"
310 IF INKEY$="" THEN GOTO VAL
320 CLS
330 RUN

```

## Maths Quiz

by Noel Stilson

```
PRINT "H      RTMS QUIZ SCORES"
PRINT "*****PRN KEY TO START PRINT *****"
```

---

```
4 GETA IPAT= "THEN
20 B=" : GOTO 40 : CHB(2) = 20 : B01,40
180 EM ADDING
101 G=(750-PNK(I)+1)*INT(50/RND(1)+1)
```

# Open Forum

from previous page

as possible is available for the screen display.

When the program is run, four pixels appear on the screen. You will control the top left pixel with the cursor keys — unshifted — in the top left quarter of the screen. The computer produces the mirror images of your pattern in the other three-quarters of the screen.

If you hold a cursor-key down, the pixel will auto-repeat in that direction until it reaches the boundary when it will stop. To copy a finished picture, Break the program and enter Copy.

To start in a different position, move the pixel to the required position, Break the program, then Continue.

Lines 14 and 20 set the initial pixel in the bottom-left corner of the top-left quarter of the screen.

Line 34 moves the pixel to the left or right if key A or S is pressed, and it hasn't reached the boundary yet.

Line 33 moves the pixel up or down, using the same logic as line 30.

Lines 50 to 100 plots the position of the pixel and its three reflections.

Line 110 returns control to the beginning of the loop.

## Labyrinth

on ZX81

In Labyrinth you are placed in an underground maze, from which you must escape before the keeper of the Labyrinth captures you. You suffer a fate worse than Sinclair write-out.

To escape from the maze you must reach the exit on the right-hand side of the maze. The maze is unlit, so you cannot see any obstructions until you meet them. As you and the keeper travel around the maze you leave H. obstacles.

You are represented by the O and the keeper by the X. Beware of the keeper, he homes in on you, and if he becomes angry he will shoot and slip between two obstructions.

You move using the cursor keys S, E, W and N to in the direction shown on the key.

At the beginning of the game you are asked which level of play you want, this governs the ratio of moves you can make to the number the keeper can make.

### Program notes

Lines 10 to 60 ask for the level of difficulty you require.

Lines 70 to 150 set up the random maze.

Lines 160 to 240 set the variables and enter the main loop.

Lines 250 to 270 allow the player to finish by checking if he has an obstruction or if he moves into open space and then prints the player at his position.

Lines 300 to 400 allow the keeper to home in on you and print his new position.

Lines 470 to 520 decide if you have been captured or escaped and print a decision, and offers you the option of another game.

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999 PRINT "X"
1000 PRINT "X"

```

Reflections  
by Simon Hunt

REFLECT THEE

REFLECT THEE

# Open Forum

## PROGRAM OF THE WEEK

```

10 GOTO 11
20 PRINT AT 2,13,"LABYRINTH"
30 INPUT "LEVEL OF DIFFICULTY (1-5) TO HARD"
40 IF A=1 THEN GOTO 50
50 IF A=2 THEN GOTO 60
60 IF A=3 THEN GOTO 70
70 IF A=4 THEN GOTO 80
80 IF A=5 THEN GOTO 90
90 LET X=1
100 LET Y=1
110 IF X=9 OR Y=10 AND X=10
120 LET X=X+1
130 NEXT Y
140 LET Y=1
150 LET X=1
160 LET Y=1
170 LET X=1
180 SLOW
190 PRINT AT 3,10,""
200 GOTO 11

```

Labyrinth

C. M. P. P.

```

370 NEXT N
380 LET C=C+1
390 LET C=C+1
400 LET C=C+1
410 IF C=1 THEN LET C=10
420 IF C=10 THEN LET C=1
430 IF C=1 THEN LET C=10
440 IF C=10 THEN LET C=1
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990 IF C=1 THEN LET C=10
1000 IF C=10 THEN LET C=1

```



YOU  
ESCAPED  
IN  
230  
MOVES  
ANOTHER  
GAME  
ENTER  
Y OR N

## Win the great new ZX Spectrum

All you have to do to enter this award scheme is send us a program in one of the following categories: (a) Games; (b) Educational/Scientific; (c) Business/Office; (d) Utility.

Programs for each category should be accompanied by a cassette, a copy of the listing and full documentation. Points will be awarded for use of machine code, innovation, structure and ease of use.

The overall winner will receive a ZX Spectrum and Printer. Individual category winners will be awarded £30 of software, and 24 runners-up will receive programming merit awards.

This is the final competition coupon. To enter the competition, you must send in your program together with any four differently numbered coupons for:

Popular Computing Weekly,  
Programming Award Scheme,  
Hothouse Court,  
19 Whitcomb Street,  
London WC2.

- 1 There is no limit on the number of entries you can send in, but each entry must be accompanied by four differently numbered competition coupons.  
2 Closing date for entries is August 15, 1982.

- 3 The names of the winners will be announced in the September 1982 issue of Popular Computing Weekly.  
4 The judges' decision is final.  
5 No employees of Sinclair Publications Ltd or their families will be eligible to enter the competition.

## Popular Computing Weekly Programming Award Scheme

Fill in this coupon. When you have collected four differently numbered coupons, send them with your program to: Popular Computing Weekly, Programming Award Scheme, Hothouse Court, 19 Whitcomb Street, London WC2.

NAME: \_\_\_\_\_  
ADDRESS: \_\_\_\_\_  
\_\_\_\_\_

PROGRAM CATEGORY: \_\_\_\_\_



# Programming

## How to pass Go and collect 200 variables

David Lawrence explains how to use variables as Goto and Gosub destinations.

When Sinclair first produced the ZX81, not a few people expressed the opinion that the way in which Goto destinations were expressed was extravagant and unnecessary. After all, it was argued, all that is really needed to cope with destinations in the range 1-9999 is two bytes — the line numbers themselves are only two bytes long.

What possible use could there be for the way in which the ZX81 allowed anything which could be interpreted as having a numerical value to be used as the destination for a Goto? Goto 30, for instance, could also be expressed as Goto code 2, Goto var 30, Goto X, Goto 5+2+5, Goto 2+X+(Y/3), Goto A(3.5) and an infinite variety of other expressions. The same is true for Gosubs.

At first sight this seems like sheer overkill. In fact, it is a reflection of Sinclair's philosophy of providing the user with real flexibility to compensate for the ZX81's limitations. Many other micro, for instance, provide a useful command usually known as 'On ... Goto' (sometimes Goto On) which allows one to choose a variety of destinations to be chosen on the basis of a simple condition.

```
ON X GOTO 10,20,30,40,50
```

This means that whenever X is in the range 1-5, program execution will jump to the line destination shown. Otherwise the instruction will be ignored. This has the effect of replacing in this particular case, five if ... Then instructions.

```
IF X=1 THEN GOTO 100
IF X=2 THEN GOTO 200 etc
```

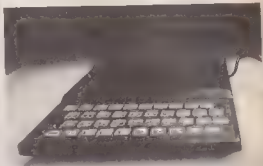
The ZX81 has no such command. But the extraordinary flexibility of the way in which Goto destinations can be expressed does open up a variety of possibilities. One Goto itself can be simulated quite simply in 2 lines such as:

```
10 LET A=1000100010000000
20 GOTO VAL A$(X/10) TO X/10
```

If there is a possibility of X taking outside the range 10 options the program is designed in code with, or if you want a default destination the following could be used:

```
10 LET A$="100010001000000000"
15 IF X=0 OR X=1 THEN LET X=5
20 GOTO VAL A$(X-1) TO X+1
```

For anything other than the range 1-5, the program will now continue execution at



ZX81 The extraordinary flexibility of the Goto facility opens a variety of possibilities

line 30. It could equally have been made to jump back — for instance to a menu with only five alternatives.

For those programming in BASIC it is also feasible to use Goto values of single characters as destinations, provided that none of the destinations is greater than 255. AS would need only to have as many characters as there are choices for destinations. The Goto instruction would take the form Goto Code AS(X).

It is often possible to design a program so that an input value can be used to directly determine a destination. Take the example of a program function to determine how many days have passed since the beginning of the year. The result is achieved by subtracting the number of days in the remaining months from 365. But, note how the jump to the correct month to start subtraction is achieved.

```
10 PRINT "ENTER CURRENT MONTH"
20 INPUT M
30 LET D=365
40 GOTO 40-M*31
50 LET D=D-28
60 LET D=D-31
70 LET D=D-30 etc
```

Where the number of lines permits, it is also possible to structure a whole program to allow an input to directly determine the destination for a Goto or Gosub. Take the example of a program which has a 'menu' of five functions:

```
100 PRINT "CHOOSE FUNCTION"
110 INPUT X
120 GOSUB X*500
130 GOTO 100
500 SUBROUTINE 1
700 SUBROUTINE 2
1500 SUBROUTINE 3
2000 SUBROUTINE 4
2500 SUBROUTINE 5
```

It is sometimes possible to base the calculation of a Goto destination on figures

arising during the course of a program, though this will often mean adopting a very irregular structure of line numbers. In the following example, the aim is to calculate the month in which a particular day of the year falls (the day having arisen as the result of previous calculations).

```
10 IF D=10 THEN LET D=11
20 GOTO D-2
21 STOP
30 PRINT "JANUARY"
40 RETURN
110 PRINT "FEBRUARY"
115 RETURN
190 PRINT "MARCH"
191 RETURN etc
```

Note how 11 must in this case be multiplied by two in order to ensure room for the Return instructions — (here, of course, never be a case of D=31.5. If this had not been done, we might have mistakenly numbered the lines.

```
31 PRINT "JANUARY"
32 RETURN
```

with the result that nothing would be printed for day 32.

This principle can be applied whenever the action to be taken by a program varies predictably according to the value of a known variable.

Finally, remember that the capacity to use variables as destinations for Gotos and especially Gosubs, gives you the opportunity to put some structure into your programs by using named subroutines. Having decided upon the name for a routine, declare that name as a variable at the beginning of the program and give it a value corresponding to the line number at which the routine commences. From then on you can use lines like Gosub Instructions which can help to make the functioning of a program much more comprehensible.

# Sound & vision



## Dumping It all on the printer

This is a simple program suitable for PePi and Vice which dumps the contents of the screen onto a printer. It consists of two interactive loops, one for the length of each line and one for the number of lines

on the screen. The main routine inside these loops peeks each position on the screen in turn, and converts the value into the correct chr\$ code for printing.

Line 10160 adjusts the print output so that graphic characters join up vertically on the Commodore 4022 printer. I assume there is a similar process for the Vic printer. Line 10440 resets the 4022 printer to normal. When using the printer in this way the page throw facility is upset and so the top of the form will need to be reset.

Vic owners will be able to convert the program so that the variables LL (line length) and NL (number of lines) can be calculated by peering control registers 3 and 4 and masking out the unwanted bits.

In control register 3 (36866) bits 0-6 contain the number of columns in the video matrix. In control register 4 (36867) bits 1-6 contain the number of rows in the

video matrix. The following statements will calculate the values:

```
LL=PEEK(36866)/AND 127
NL=INTPEEK(36867)/AND 127/40
```

It should be possible to use this routine to dump Hi-Res graphics onto the printer, but I have not tried it. I would like to hear if anyone has any success. Also, the top of screen variable will have to be altered, depending on the method used.

PePi owners with 80 column screens will need to omit lines 10200, 10220 and 10390, and change line 10340 to Print#1. Note that the Print# statements must be typed in full, 7# is not allowed.

The program can be added to the end of the user program which intends to call it or can be loaded after the screen is completed — as long as the user program is larger in size than the Screenprint program.

Ken Clark

```
10000 REM *** SCREENPRINT ** (C) KEN CLARK 1982
10010 REM
10020 REM TS = TOP OF SCREEN POINTER: FOR PET'S TS = 32768
10030 REM FOR VIC'S WITH MORE THAN 80 OF MEMORY TS = 1024
10040 REM OTHERWISE TS = 7680
10050 REM
10060 REM LL = LINE LENGTH: FOR VIC'S LL = 22
10070 REM FOR 40 COLUMN PET'S LL = 40 . FOR 80 COLUMN PET'S LL = 80
10080 REM
10090 REM NL = NUMBER OF LINES: FOR PET'S NL = 25 . FOR VIC'S NL = 23
10100 REM
10110 TS=32768:LL=40:NL=25
10120 REM
10130 REM *** OPEN PRINTER AND ADJUST SPACING FOR GRAPHICS ***
10140 REM
10150 OPEN "A:4:4:PRINTER.DMP":A=1:CLOSE A
10160 REM
10170 REM
10180 REM *** START SCREEN BOX ***
10190 REM
10200 PRINT#1," " ; FOR Z=1 TOLL PRINT#1," " ; NEXT Z:PRINT#1," "
10210 FOR XLOOP=1 TOLL
10220 PRINT#1," " ;
10230 FOR YLOOP=1 TOLL
10240 REM
10250 REM *** GET A CHARACTER FROM THE SCREEN AND CONVERT ***
10260 REM
10270 R=PEEK(TS)
10280 IF R=131 AND R/128=1 THEN PRINT#1," " ; CHR$(R) ; " " ; GOTO10020
10290 IF R/127 THEN PRINT#1," " ; CHR$(R-64) ; " " ; GOTO10020
10300 IF R/63 AND R/63 THEN PRINT#1,CHR$(R+128) ; GOTO10020
10310 PRINT#1,CHR$(R+64) ;
10320 TS=TS+1
10330 NEXT YLOOP
10340 PRINT#1," " ;
10350 NEXT XLOOP
10360 REM
10370 REM *** FINISH SCREEN BOX ***
10380 REM
10390 PRINT#1," " ; FOR Z=1 TOLL PRINT#1," " ; NEXT Z:PRINT#1," "
10400 REM
10410 REM *** CLOSE & RESET PRINTER ***
10420 REM
10430 CLOSE1
10440 OPEN10,4,10:PRINT#10:CLOSE10
```

# Peek & poke

Peek your problems to our address. Ian Beardsmore will poke back an answer.

## ER, WHAT DO I DO NOW PLEASE?

David Scott of Inverary Avenue, Llanelli, writes:

**Q** I am in possession of the owner of a Tandy pocket computer, but I am considering buying a larger colour computer such as the ZX Spectrum, or a Vix20. I wonder if you could answer some questions for me.

Is there any memory expansion available for the Vix20 larger than 48K? Are there any ways to let the Spectrum or the Vix20 be suitable for other languages such as forth, CP/M or Pascal? What can the RS232 interface be used for, besides printers?

How are you details of the Vix20 and the Vix20 new run-on computers? What sort of price are they?

Are the Spectrum and the Vix20 capable of outside communication, ie modem? If so, what supplies them? Also, do you publish programs for the TRS80 pocket computer?

**A** A lot of questions to answer, but here I go. There is a disc drive available for the Vix20, which stores 174K, that can be accessed in 664 blocks. There is a review of the disc drive in our May 20 issue. The drive is available from Commodore in Slough, for £750.

Commodore do a forth cartridge for the Vix and forth is available for the ZX81. So, a Spectrum version is very probable, given that ZX81 Basic is more or less a complete subset of Spectrum Basic.

CP/M is, to my knowledge, not available for the Vix. It is a Z80-based system, so it is possible that it might be developed for the Spectrum in the coming months, especially once the microdrive is released.

An RS232 interface can be used for printers or for modems. While it is used to interface other peripherals, the printer option is the most common. Depending on the individual computer, the RS232 can be used for sound boards, extra graphic boards, control

packs and for the external control of anything from model railways to robots to Vindata screens.

I wrote about the Vix20 in PCW, July 15. The Vix20 is just a 64K version of the Vix10 with a 1M Ram onboard, and 20K onboard ROM. It has control/track joysticks and four paddles. The price being discussed is £500 and the provisional release date is early 1983.

At the moment, I do not know of any modern hardware actually available for the Vix20. As far as the Spectrum is concerned, the first models are only getting through now.

As for programs for the TRS80, we are happy to consider programs for any computer. It is sometimes odd that we are monopolised by a few machines. What we publish reflects what we are sent. We cannot publish programs for machines if no one sends them to us.

## TO ERROR IS HUMAN IS IT NOT?

Dave Webb of Seewat Avenue, Sandbach, Cheshire, writes:

**Q** I would like to know how to Poke the error code off the screen using a ZX81. Is the same way you can on the ZX80.

**A** You cannot Poke the error code off in the same way as you can on the ZX80, or ZX81 with one key. If you want to move the error code, first ensure that you are in Fast mode. Next, make the last line of your program LET L=USR 681. When you have done this, the program will stop but there will be no error code.

## ON TO BE HUMAN IS AN ERROR?

W E Rodgers of Sheldon Road, Dagenham, Essex, writes:

**Q** I have two points about which I would like your opinion.

Firstly, in the faulty Rom test in the May 15 issue of PCW, the line Print 1-32-1 gives an answer rounded up to

4294967300 not 4294967296 as stated.

Secondly, in the program Mover 2, for the ZX81, I keep getting an error code 2 followed by a line number. The line number that follows is always a line that reads NEXT N is 2:630 but it is sometimes the same line number.

**A** The answer to your first question is that your Rom should be all right. The correct answer was worked out the old-fashioned way by pencil and paper. Because the ZX81 is only accurate to 9 places, it has to round up or down any digits after that (see letters PCW, July 15).

The second problem is caused by a printing error. The +1 should go inside the outer set of brackets, so the line should read

10 COSPI 100:PRINTROUNDED 11

This generates a whole number between one and nine and then multiplies it by 100. The form as printed gives a number between eight and eight, multiplies this by 100 and then adds one.

So, if the number six is generated this will become 601 plus one. The computer is trying to Goto 601, but it cannot so it gives the internal command working on line 170 it should not be there because it has not been to add and therefore does not know what N is.

## TO B OR NOT TO BE, THAT IS...

M Hubbard of Robert Adam Crescent, Hulme, Manchester, asks:

**Q** Please could you explain to me the difference between a model B 84C microcomputer, and a model A micro with a £35 14K memory expansion — apart from the obvious 64C and the printer port. How easy is it to upgrade the model A to the B? I am interested because, apart from financial considerations, there is less demand for the A and so less waiting time.

**A** Essentially, the difference between the two is the much greater flexibility of

the model B. It has several ports and interfaces that the A does not possess.

The first and probably most useful extra is the Acorn Tube which allows the use of a second processor. This second processor does not have to be a 6502, but could for example be a Z80. This automatically opens up the vast field of CP/M for the Bech more. It also makes the operating times a lot faster because the first 6502 chip does not have to stop calculating to output data. The calculations can all be done simultaneously by the second processor.

The model B also has an RS232 port for use with a serial printer or modem. Other extras include an RGB output for monitors and an analogue port for use with joysticks or laboratory instruments.

When you pay the extra for the model B you are paying for potential, as represented by the extra ports. Whether you think it is worth the extra money is up to you, but perhaps you can now understand why the model B is out-selling the model A by about two to one.

It will probably become possible to upgrade the model A to near the specification of the B by using mother boards with additional ports as and when they come on so the market. This will I am sure, in the long run cost more, and I doubt if the Acorn Tube will even become available.

STOP agonising over that nagging problem. Write to Ian Beardsmore at Peek & poke for the answer. Letters should be as brief as possible and include full name and address.

Try and limit yourself to one question per letter. Write to: Peek & poke, Popular Computing Weekly, Highbury Court, 14 Whiteomb Street, London WC2 7HF.



# Competitions

## It's cool to be a perfect square

A perfect square is a whole number, the square root of which is also a whole number — 4, 9, 16 and 25 are all perfect squares. Any whole number, multiplied by itself, gives a value which is a perfect square.

A number of familiar ideas are linked to that of perfect squares. Noughts and crosses is played on an area of nine cells arranged in three rows of three. This is said to be a square of order 3. Similarly, a chessboard is a square of order 8, and the oriental game of Go is played on a grid of order 19.

Let us take a look at some of the properties of square numbers. First, write out the eleven numbers 0 to 10 and, underneath write their squares.

```

0 1 2 3 4 5 6 7 8 9 10
0 1 4 9 16 25 36 49 64 81 100
  
```

Notice how the last figure of each of the squares runs in the sequence 0, 1, 4, 9, 6, 5, 6, 9, 4, 1, 0. This can be proved as a negative check that a number is not a perfect square.

If the last figure of any number is either 2, 3, 7 or 8 then that number cannot be a perfect square.

A similar check can be carried out using the digital root of a number. To find the digital root add together each of the digits, and then, if this total is more than one digit, add these digits together until a single digit remains. For example, the digital root of 73442149036 is

```

7+3+4+4+2+1+4+9+0+3+6=51
5+1=6
  
```

This tells us that the number cannot possibly be a perfect square. To see why, here is a

program that finds the digital roots of successive square numbers up to 500. If you run it you will see that the digital roots run in the cyclical sequence comprising just four 10-figure digits. In our digital root is not one of these, then that number cannot be square.

```

10 FOR N = 1 TO 32
20 LET AS = -STRS N:IN
30 LET A = 0
40 FOR M = 1 TO LEN AS
50 LET A = A + VAL AS(M)
60 NEXT M
70 IF A > 9 THEN GOTO 200
80 PRINT A
90 NEXT N
200 LET AS = -STRS A
210 GOTO 30
  
```

This provides us with a useful negative check.

### Puzzle No. 10

Can you find (a) the lowest and (b) the highest perfect square that can be made using in each case the nine digits 1 to 9 (each digit is used only once, and zero is not used)?

### Solution to Puzzle No. 11

The answer to the puzzle is 10201, which is 101 squared. The next square is 121, which is 11 squared. The next is 144, which is 12 squared. The next is 169, which is 13 squared. The next is 196, which is 14 squared. The next is 225, which is 15 squared. The next is 256, which is 16 squared. The next is 289, which is 17 squared. The next is 324, which is 18 squared. The next is 361, which is 19 squared. The next is 400, which is 20 squared. The next is 441, which is 21 squared. The next is 484, which is 22 squared. The next is 529, which is 23 squared. The next is 576, which is 24 squared. The next is 625, which is 25 squared. The next is 676, which is 26 squared. The next is 729, which is 27 squared. The next is 784, which is 28 squared. The next is 841, which is 29 squared. The next is 900, which is 30 squared. The next is 961, which is 31 squared. The next is 1024, which is 32 squared. The next is 1089, which is 33 squared. The next is 1156, which is 34 squared. The next is 1225, which is 35 squared. The next is 1296, which is 36 squared. The next is 1369, which is 37 squared. The next is 1444, which is 38 squared. The next is 1521, which is 39 squared. The next is 1600, which is 40 squared. The next is 1681, which is 41 squared. The next is 1764, which is 42 squared. The next is 1849, which is 43 squared. The next is 1936, which is 44 squared. The next is 2025, which is 45 squared. The next is 2116, which is 46 squared. The next is 2209, which is 47 squared. The next is 2304, which is 48 squared. The next is 2401, which is 49 squared. The next is 2500, which is 50 squared. The next is 2601, which is 51 squared. The next is 2704, which is 52 squared. The next is 2809, which is 53 squared. The next is 2916, which is 54 squared. The next is 3025, which is 55 squared. The next is 3136, which is 56 squared. The next is 3249, which is 57 squared. The next is 3364, which is 58 squared. The next is 3481, which is 59 squared. The next is 3600, which is 60 squared. The next is 3721, which is 61 squared. The next is 3844, which is 62 squared. The next is 3969, which is 63 squared. The next is 4096, which is 64 squared. The next is 4225, which is 65 squared. The next is 4356, which is 66 squared. The next is 4489, which is 67 squared. The next is 4624, which is 68 squared. The next is 4761, which is 69 squared. The next is 4900, which is 70 squared. The next is 5041, which is 71 squared. The next is 5184, which is 72 squared. The next is 5329, which is 73 squared. The next is 5476, which is 74 squared. The next is 5625, which is 75 squared. The next is 5776, which is 76 squared. The next is 5929, which is 77 squared. The next is 6084, which is 78 squared. The next is 6241, which is 79 squared. The next is 6400, which is 80 squared. The next is 6561, which is 81 squared. The next is 6724, which is 82 squared. The next is 6889, which is 83 squared. The next is 7056, which is 84 squared. The next is 7225, which is 85 squared. The next is 7396, which is 86 squared. The next is 7569, which is 87 squared. The next is 7744, which is 88 squared. The next is 7921, which is 89 squared. The next is 8100, which is 90 squared. The next is 8281, which is 91 squared. The next is 8464, which is 92 squared. The next is 8649, which is 93 squared. The next is 8836, which is 94 squared. The next is 9025, which is 95 squared. The next is 9216, which is 96 squared. The next is 9409, which is 97 squared. The next is 9604, which is 98 squared. The next is 9801, which is 99 squared. The next is 10000, which is 100 squared.

The bee flies a total distance of 256 (64 feet 16 inches, 200 yards) — making it an incredibly industrious insect.

The program to give the solution works by interlocking D by 2 to give the distance between each successive hour. This is added to H to give the distance to the hive and twice

the distance (to allow for the return journey) is added to T, the total distance flown.

```

100 PRINT "TOTAL DISTANCE " T: " FEET"
  
```

### Puzzle

The winner of the puzzle will be the reader who, in the opinion of *Popular Computing Weekly*, has submitted the best solution. Preference will be given to solutions which show how the entrant arrives at the correct answer.

Envelopes containing entries should be marked clearly with PUZZLE.

The closing date for the competition is *Times* day, August 10.

### Winner of Puzzle No. 11

The winner is Gary Jones, Green Way, Come England. Conductor also receives £10.

### Solution to Crossword No. 11

Across: 3 Ace, 9 Huggles, 10 Elements, 11 Gun, 13 Grown, 14 Rapist, 17 Lure, 18 Peacock, 20 Steeped, 21 Par, Down: 1 Gaur, 2 Teapoint, 2 pH meter, 4 Duff, 5 Age, 6 Cardisgraph, 7 Weir, 12 Ramble, 15 Theory, 16 Relay, 17 Let, 18 Sky.

### Winner of Crossword No. 11

The winner is L. Lightfoot, Lynton Avenue, Clayton-Moore, Accrington, who receives £10.

## CITIZEN PAIN

BY DAVID IRELAND and JAMES MACDONALD

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